Final Technical Status Report

For

Initiative No. BRG-57

"Sustainable Precision Green Manufacturing: Advanced Hybrid Reactive Armor Materials"

Reporting Period: through 30 Apr 2014

CLogic LLC

Initiative Team Technical POC

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Report Documentation Page

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1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
30 APR 2014	**Final**	

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Final Report Sustainable Precision Green Manufacturing Advanced Hybrid Reactive Armor Materials	**BAA# W15QKN-08-R-0252**
	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER **N/A**
6. AUTHOR(S) **Herbst /Diana-Lynn**	5d. PROJECT NUMBER **BRG-057**
	5e. TASK NUMBER **N/A**
	5f. WORK UNIT NUMBER **N/A**
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **CLogic, LLC 26 Sky View Drive Avon, CT 06001**	8. PERFORMING ORGANIZATION REPORT NUMBER **BRG-57-F**
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) **ARDEC**	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT
Prototype efforts to design, develop, evaluate, and prototype lightweight reactive armor systems using hybrid armor materials for vehicles that resist increasingly lethal threats, including simultaneous attacks from different weapons.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**UU**	**6**	

1. Comments on Technical/Cost/Schedule Performance

Technical: Completed

Cost: Completed

Schedule: Work is on schedule

2. Initiative Quad Chart

Conversion of Munitions Components into Higher Value Products	
Goals & Objectives	**Initiative Information**
Development of lower cost hybrid armor material for use in reactive armor tiles and "high rate" fabrication capabilities are key to weight reduction by means of replacement of steel with advanced armor solutions in vehicle structures and components. Upgrading and maintaining of government owned and operated facilities so as to ensure safety and security of all while research and development are taking place.	**Initiative Lead**: CLogic LLC **Team Members**: Force Protection and Explosively Formed Penetrator (FP&EFP) Branch, US Army RDECOM-ARDEC **Period of Performance**: 3 years
Milestones & Technical Achievements	**Implementation & Payoff**
All milestones have been completed	**Schedule**: April 2014 **Status**: 100% complete
	Technology will provide prototype lightweight reactive armor systems using hybrid armor materials for vehicles that resist increasingly lethal threats, including simultaneous attacks from different weapons. Technologies include lightweight composites, ceramics, metal-ceramic compounds, nanomaterials, and more advanced reactive and active protection systems. This laboratory upgrades will provide ARDEC the enabling technologies to demonstrate and produce the technologies that are developed under this contract effort and support ongoing ARDEC efforts in the areas of energetics and warheads.
Current Status: Technical = Green Schedule = Green Cost = Green	

3. Supplemental Information

In order to improve the usefulness of the quad charts and provide DOTC with sufficient initiative information, the Quarterly Report must be supplemented with data described below.

3.1 Technical Achievements

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Milestone Status:

MS #	Deliverable	Status
1	Design and specifications for prototype precision engineering laboratory	100%
2	Quarterly business and technical status report	100%
3	Review of armor materials and designs.	100%
4	Prototype add on armor kit(s) for government specified vehicle(s).	100%
5	Barrier materials and designs	100%
6	Upgrade WB Phase 1a	100%
7	Prototype add on armor kit(s) for government specified vehicle(s).	100%
8	Upgrade WB Phase 1b	100%
9	Phase 2 Prototype add on armor kit(s) for government specified vehicle(s).	100%
10	PFNHE-SIT Phase 1	100%
11	Upgrade WB Phase 1c	100%
12	Upgrade SN Phase 3 (CR)	100%
13	Quarterly business and technical status report	100%
14a	Upgrade SN Phase 2 (BR-2)	100%
14b	Upgrade SN Phase 2 (BR-3)	100%
14c	Upgrade SN Phase 2 (BR-4)	100%
14d	Upgrade SN Phase 2 (BR-5)	100%
14e	Upgrade SN Phase 2 (BR-6)	100%
14f	Upgrade SN Phase 2 (BR-7)	100%
14g	Upgrade SN Phase 2 (BR-8)	100%
15	Phase 1 Prototype add on armor kit(s) for government specified vehicle(s).	100%
16	Upgrade initiation Phase 1 (CR and 204)	100%
17a	Upgrade SN Phase 4 (FO)	100%
17b	Upgrade SN Phase 4 (FO)	100%
17c	Upgrade SN Phase 4 (FO)	100%
17d	Upgrade SN Phase 4 (FO)	100%
17e	Upgrade SN Phase 4 (FO)	100%

17f	Upgrade SN Phase 4 (FO)	100%
18a	Upgrade WB Phase 3	100%
18b	Upgrade WB Phase 3	100%
18c	Upgrade WB Phase 3	
18d	Upgrade WB Phase 3	100%
18e	Upgrade WB Phase 3	100%
19	Upgrade WB Phase 2	100%
20	Quarterly business and technical status report	100%
21	CSI Poster Review (Review of the time line of government lab upgrades).	100%
22	Quarterly business and technical status report	100%
23	PFNHE-SIT Phase 2	100%
24	PFNHE-SIT Phase 3	100%
25	PFNHE-SIT Phase 4	100%
26	PFNHE-SIT Phase 5	100%
27	PFNHE-SIT Phase 6	100%
28	PFNHE-SIT Phase 7	100%
29	PFNHE-SIT Phase 8	100%
30	PFNHE-SIT Phase 9	100%
31	PFNHE-SIT Phase 10	100%
32	PFNHE-SIT Phase 11	100%
33	PFNHE-SIT Phase 12	100%
34	SLAM Barrier materials and designs	100%
35a	Upgrade WB-1 Phase 4	100%
35b	Upgrade WB-2 Phase 4	100%
35c	Upgrade WB-3 Phase 4	100%
35d	Upgrade WB-4 Phase 4	100%
35e	Upgrade WB-5 Phase 4	100%
35f	Upgrade WB-6 Phase 4	100%
35g	Upgrade WB-7 Phase 4	100%
35h	Upgrade WB-8 Phase 4	100%
36a	Upgrade WB-1 Phase 5	100%
36b	Upgrade WB-2 Phase 5	100%
36c	Upgrade WB-3 Phase 5	100%
37	Fully integrated and optimized laboratory facility	100%
38	Annual Technical Report	100%
39	Quarterly business and technical status report	100%
40	Upgrade SN Phase 5 (AD)	100%

41	Quarterly business and technical status report	100%
42	Upgrade SN Final (V/S)	100%
43	Quarterly business and technical status report	100%
44	Phase 3 Prototype add on armour kits for governemnt specified vehicles	100%
45	Phase 4 Prototype targets for government specified vehicle	100%
46	Design drawings and report on manufacturing of each prototype.	100%
47	Annual Technical Report and Quarterly Business Status Report	100%
48	Quarterly business and technical status report	100%
49	Quarterly business and technical status report	100%
50	Quarterly business and technical status report	100%
51	Quarterly business and technical status report	100%
52	Annual Technical Report and Quarterly Business Status Report	100%
53	Quarterly business and technical status report	100%
54	Quarterly business and technical status report	100%
55	Quarterly business and technical status report	100%
56	Final Business Status Report (1)	100%
57	Final Technical Report	100%

3.3 Technical Readiness Level Status and Technology Transfer Information:

Please indicate the current Technology Readiness Level (TRL) and technology transfer information for the prototype development effort based on the information requested and definitions in the chart (Insert chart number) below.

Technology Transition Information

1. Technology or technologies being worked on: Improvements to the Objective Gunner Protection Kit: Catcher Rings. The Catcher Rings provide additional safety to a gunner in the event of an IED, blast or other catastrophic event. It assures that the OGPK will not shift on the Mine-Resistant Ambush Protected All Terrain Vehicles (M-ATV) if the vehicle is impacted. The catchers rings are in production and all DoD M-ATV's will be retrofitted with them.

2. Is this technology an extension of a previous DOTC agreement or contract: No

3. System to which technology can transition: Objective Gunner Protection Kit

4. Commercial applications if applicable: N/A

5. Government organizations or DoD Armed Force Services interested in technology other than AOR's organization: The Objective Gunner Protection Kit is used on

Army and Marine Corps Tactical Vehicles and the Catcher Rings will transition to all DoD MRAP vehicles with a Gunner Protection Kit

6. DoD Armed force services or organizations that could benefit from technology (not mentioned above): not applicable. The organizations that have MRAP vehicles are currently retrofitting those vehicles with this technology

7. Initial Technology Readiness Level (TRL) of technology at the start of agreement: 5

8. Current Technology Readiness Level (TRL) of technology: 8

9. Final Technology Readiness Level (TRL) of technology expected at end of agreement: 8

10. Next step in technology transition process: The items are fielded and ARDEC has recently license the intellectual property for the OGPK to CLogic Defense. CLogic Defense intends to produce the OGPK commercially for foreign military sale

3.4

Non-Traditional Defense Contractor Participation

Name of Nontraditional*	Planned Start Date	Actual Start Date	Reason for Deviation from Plan
CLogic Defense	7/09/09	7/09/09	

Plans for Next Quarter: Deliver the following to the Government:

None – work is completed